Space Weather Forecast

Issued on Tuesday, 04 July 2023 at 13:05 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate R1/R2 Radio Blackouts likely. G1/Minor Storm to G2/Moderate Storm possible on 06 July with CME arrival.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low, with occasional Common-class flares. There are currently six sunspot regions on the visible disc. A region near the northwest limb remains the largest and most complex region on the disc. This is becoming more difficult to analyse as it continues to rotate closer to the northwest limb. Another region in the southeast maintains a slightly complex magnetic structure. A further region in the northeast has continued to show minor growth and has a partially north-south aligned magnetic structure, perhaps increasing instability. The remaining regions on the disc are relatively small or simple.
A recent Coronal Mass Ejection (CME) has emerged in coronagraph imagery. This is still under analysis, but looks likely to have an Earth directed component, which may arrive during 06 July.

Solar Wind / Geomagnetic Activity: The solar wind has been at mostly background levels. Wind speeds have varied between 340-420 km/s. The Interplanetary Magnetic Field was weak throughout, while the north-south component also varied weakly. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Low to Moderate activity is likely, with a slight chance of further Strong flares. The risk is mostly coming from the large sunspot in the northwest, and reduces as this region rotates off the visible disc.

Solar Wind / Geomagnetic Activity: A CME which occurred earlier on 04 July is still under assessment, but appears to have an Earth directed component. This currently seems most likely to arrive later on 06 July. Solar wind speeds are currently at background levels. Any enhancements during 04 July from a small coronal hole are expected to be weak. A further coronal hole fast wind is likely either on day 4 (07 July) or after the end of this period on 08 July, with solar winds increasing to between 500-600km/s.

Geomagnetic activity is expected to be mostly Quiet to Unsettled at first, increasing to Active to G1/Minor Storm with any CME arrival, with a chance of G2/Moderate Storm and a slight chance of G3/Strong Storm activity. As the CME effects wane, Unsettled to Active conditions may be prolonged by any fast wind later in the period, with a chance of G1/Minor Storm intervals.
Energetic Particles / Solar Radiation: Solar radiation has a slight but declining chance of reaching the S1/Minor Storm threshold throughout the period, mainly from the large region in the northwest. The risk reduces as this rotates away from the visible disc.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	50	30
Strong	G3	No	1	1	10	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	50	40	30
Very Active	R3 to R5 X	No	15	10	10	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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